Bases for GS-mark tests of IT Equipment in Combination with Visual Display Units*

(2015-01-01)

The processing of test principles for the evaluation of visual display units occurred initially in Germany under management of the Administrative Legal Accident Insurance. With the reorganization of the Experience Exchange of GS Test Organizations, Exchange of Experience Forum 1 (EK1) assumed this task in 1998.

With the progress of European standardization, and with increasing experience in the assessment of IT equipment in combination with visual display units, the test principles are being maintained up to date.

New display techniques, as PDA's, micro displays and beamers can be included. Therefore, the test principles were provided with a new number, complemented with the date of the current state of the discussions as a permanent document.

These test principles comprise the requirements that are prerequisites for the safe and ergonomic design of the equipment. In addition, there are requirements for placing on the market, for the workplace and the workplace environment, which are to be considered by the user or operator, and therefore, are not subject to these test principles. Beyond these test principles further requirements exist like laws and directives and others.

These test principles are to be used in the current version at the time of the investigation. Certificates that refer to earlier versions of this document remain basically valid within the frame of the usual period of validity of a GS Certificate, unless EK1 decides in exceptional cases due to urgent necessities differently.

Disclaimer: This is a translation from the German original version to English. In the case of any inconsistencies the German version is valid!

*) Visual display units within the meaning of the ordinance for work with visual display units.

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A.1 General Principles

A.1.1 Guidelines and Laws

2006/95/EC
Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (codified version).

2004/108/EG
Directive of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC.

90/270/EWG
Council Directive of 29 May 1990 on the minimum requirements concerning the safety and health protection during work on visual display units (Individual Directive in the context of Article 16, Clause 1 of Directive 89/391/EEC), implemented in Germany by the Ordinance on Visual Display Units (Occupational Safety Law, 19. December 1998 version).

2001/95/EG
Directive of the European Parliament and of the Council of 3. December 2001 on general product safety.

German Product Safety law – ProdSG
Law on the provision of products on the market, December 1, 2011

Electromagnetic Compatibility of Equipment Act **(EMVG),** 26.02.2008

Ordinance on occupational safety and health protection during work with visual displays (**Bildschirmarbeitsverordnung** - BildscharbV), 04. December 1996 version.

Ordinance on the protection against injury by X-ray radiation (**X-ray Ordinance** - RöV), 08 January 1987 version.

R&TTE directive 1999/5/EC
Directive on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity

A.1.2 Test and Evaluation Considerations

The manufacturer defines the intended context of use of the equipment. If necessary, he has to determine any special environmental conditions in the Instructions for Use. These declarations are to be considered during the test and are to be repeated in the certificate. In particular, restrictive declarations of the manufacturer in his product description must also be documented in the certificate.

Information necessary for installation, startup procedure and safe use must accompany the product in writing (German language). Broader information may be contained on data storage devices (CD, floppy disk).

The existing test principles are binding on all GS test- and certification bodies and are to be considered by market surveillance authorities in Germany too.

If the requirements of the applicable standards are not specific, the Essential Requirements of the Directives or the protection objectives of the Standards are to be interpreted by the experts accordingly.

A.2 Standards for Product Safety

A.2.1 Basic Standard related to the scope „visual display workplace“

DIN EN 60950-1	Safety of information technology equipment
DIN EN 60065	Audio, visual and similar electronic apparatus - Safety requirements

Additionally, the following standards may be applicable:

A.2.2 Safety in General
Cancelled (31st meeting AG1 EK1)

A.2.3 Electrical Safety
Cancelled (31st meeting AG1 EK1)

A.2.4 Mechanical Safety
Cancelled (31st meeting AG1 EK1)

A.2.5 Safety concerning high temperature

CENELEC Guide 29	Temperatures of hot surfaces likely to be touched

A.2.6 Safety concerning noise

DIN EN ISO 7779	Acoustics; measurement of airborne noise emitted by information technology and telecommunications equipment
DIN EN 29295	Acoustics; measurement of high-frequency noise emitted by computer and business equipment (ISO 9295:1989); German version EN 29295:1991
ISO 9296	Acoustics; declared noise emission values of computer and business equipment
DIN EN 50332-1	Sound system equipment: Headphones and earphones associated with portable audio equipment - Maximum sound pressure level measurement methodology and limit considerations - Part 1: General method for "one package equipment";
DIN EN 50332-2	Sound system equipment: Headphones and earphones associated with portable audio equipment - Maximum sound pressure level measurement methodology and limit considerations - Part 2: Matching of sets with headphones if either or both are offered separately.

A.2.7 Labelling and Information in Instructions for Use

ISO/IEC 25051	Software engineering — Software product Quality Requirements and Evaluation (SQuaRE)
ISO/IEC Guide 37	Instructions for use of products of consumer interest
DIN EN 62079	Preparation of instructions Structuring, content and presentation
DIN EN 82079-1	Preparation of instructions for use – Structuring, content and presentation – Part 1: General principles and detailed requirements

A.2.8 Ergonomic design

For testing of the ergonomic design of a product in particular apply:

DIN 2137-1	Keyboards for data and text input – Part 1: German keyboard layout
DIN 2137-2	Keyboards for data and text input – Part 2: Additional requirements;

DIN EN ISO 9241-1	Ergonomic requirements for office work with visual display terminals (VDTs) - Part 1: General introduction (ISO 9241-1:1997); German version EN ISO 9241-1:1997
DIN EN 29241-2	Ergonomic requirements for office work with visual display terminals (VDTs); part 2: guidance on task requirements
DIN EN ISO 9241-6	Ergonomic requirements for office work with visual display terminals (VDTs) - Part 6: Guidance on the work environment
DIN EN 60068-2-70	Environmental testing - Part 2: Tests - Test Xb: Abrasion of marking and letterings caused by rubbing of fingers and hands
DIN EN ISO 9241-3xx (xx steht für 00-07)	Ergonomic requirements for visual displays
DIN EN ISO 9241-4xx (xx steht für 00-20)	Ergonomic requirements for physical input devices
ISO/IEC 9995-1	Information technology - Keyboard layouts for text and office systems - Part 1: General principles governing keyboard layouts
ISO/IEC 9995-2	Information technology - Keyboard layouts for text and office systems - Part 2: Alphanumeric section
ISO/IEC 9995-3	Information technology - Keyboard layouts for text and office systems - Part 3: Complementary layouts of the alphanumeric zone of the alphanumeric section
ISO/IEC 9995-4	Information technology - Keyboard layouts for text and office systems - Part 4: Numeric section
ISO/IEC 9995-5	Information technology - Keyboard layouts for text and office systems - Part 5: Editing section and Function section
ISO/IEC 9995-7	Information technology - Keyboard layouts for text and office systems - Part 7: Symbols used to represent functions
ISO/IEC 9995-8	Information technology - Keyboard layouts for text and office systems - Part 8: Allocation of letters to the keys of a numeric keypad

A2.9 Further decisions from meetings of the Exchange of Experience Forum 1 (EK1) and its Working Group AG1

A.2.9.1 Keyboards (1st meeting AG1 EK1):
If the key board does not comply with the above mentioned standards, decisions must be made for special groups of users.

A.2.9.2 Keyboard caps, labelling of the front side (4th meeting AG1 EK1):
In principle the same requirements apply as for labelling of the topside.

A.2.9.3 Notebooks, keyboard height (4th meeting AG1 EK1):
Cancelled - 12th meeting AG1 EK1

A.2.9.4 Gloss of keyboard and housing (4th meeting AG1 EK1):
The evaluation of the contrast and the gloss of keyboards and housings are to be made with consideration of the manufacturer's specification for the intended use. If no other life cycle is indicated by the manufacturer or specifications are made by standards, the values on key caps are to be judged after 5 million cycles.

A.2.9.5 Specification for antireflection coating of monitors (4th meeting AG1 EK1):
The maximum intended illuminance or targeted application is to be indicated on the certificate.

A.2.9.6 Specification for noise in certificates (5th meeting AG1 EK1):
For the orientation of the operator the emitted sound power level are to be indicated on the certificate for operation in standby and full performance mode, according to ISO 9296 (DIN EN ISO 7779) and DIN EN ISO 29295.

A.2.9.7 Keying feedback (5th and 6th meeting AG1 EK1):
Actuation of a key shall be accompanied by a feedback. The feedback can be kinaesthetic (key displacement with snap function) or not kinaesthetically (key displacement with ramp function) accompanied by an auditory feedback. The auditory feedback can take place in terms of hardware solution (e.g. by a loudspeaker integrated in the keyboard) or by software solutions (e.g. as part of the operating system). The today generally used kinaesthetic feedback is sufficient, not however an end-impact noise (see DIN EN ISO 9241-410).

A.2.9.8 Segmented keyboards (4th meeting EK1):
Cancelled – replaced by A.2.9.13

A.2.9.9 Video graphic boards (3rd meeting EK1):
Video graphic boards are not qualified for a GS-Mark.

A.2.9.10 Keyboards, abrasion test (7th meeting AG1 EK1):
The abrasion test with synthetic sweat in its present form is confirmed. Testing with diluted (thin) Oil of Olaz can be accepted only, when the proof is produced, that the results are equivalent.

A.2.9.11 Keyboards, DIN 60068-2-70 (7th meeting AG1 EK1):
Applicable for testing are DIN EN ISO 9241 part 410 in combination with DIN 60068-2-70 (in that order). The abrasion test shall be performed with the force of 1,5 N $\pm$ 20% as defined in DIN EN ISO 9241 part 410 for an applied force for key displacement and not with the values given by DIN EN 60068-2-70.

A.2.9.12 Keyboards, laser inscription (7th meeting AG1 EK1):
The durability of legends with laser inscription has to be proofed with the test procedures as intended in DIN EN ISO 9241 part 4. If a test confirms that the durability of legends for a specific, qualified laser inscription procedure and clearly specified materials is given, specific tests could be skipped.

A.2.9.13 Segmented keyboards (8th meeting AG1 EK1):
All participants agree, due to insufficient definition of test requirements, not to accept test orders for such keyboards. Segmented keyboards with adjustable angle have to be tested in normal position according to DIN EN ISO 9241-4xx and DIN 2137.

A.2.9.14 Character size on visual displays (8Th meeting AG1 EK1):
Due to some inconsistency in ISO 9241-3, the test is conducted with a character size of 20 min. of arc. Equivalent test pattern with horizontal or vertical lines may be used if not otherwise specified by the manufacturer. An example for a 17" CRT is given in annex 2.

A.2.9.15 Keyboard layout, Notebook keyboards (9th + 12th meeting AG1 EK1):
The layout must be suitable for the intended user group. The tests are performed in accordance with DIN 2137.

A.2.9.16 Deviations from test basis
In case of deviations from test basis EK1-ITB 2000 the following procedure apply:

1. Preparation of an test report. The test report shows the deviation from the test basis.
2. Proof of necessity of the deviation.
3. Presentation of the results within the working group (EK 1-AG1)

Alternative test method for keyboards (addition):

4. Performing of an user test concerning the acceptance of deviations by a qualified laboratory according to DIN EN ISO 9241-4xx and DIN EN ISO 9241-11
5. Presentation of the results within the working group (EK 1-AG1)

A.2.9.17 No longer considered.

A.2.9.18 Evaluation of gloss within the direct field of view
Company logos are not considered during gloss measurements.

A.2.9.19 GS test with restricted function / scope

For GS tests of IT equipment used within a restricted scope (like home area, entertainment, toys etc.) or function (like short text input) the test has to follow the test principles EK1-ITB 2000. Deviations and their necessity shall be reported within the test report.

When deviating from the application of the ergonomic requirements of these test principles in the context of a device evaluation, the following guidelines have to be considered:

- intended functions of the considered product
- range of application provided by the manufacturer
- expected average duration of use of displays and controls

The present test principles always have to be applied if at least one of the above guidelines impair the user's safety significantly.

A.2.9.20 No longer considered.

A.2.9.21 No longer considered.

A.2.9.22 No longer considered.

A.2.9.23 Graphic boards (11th and 26th meeting AG1 EK1):

If a graphic board offers an analogue and/or digital output following requirements of ISO 9241-307 have to be evaluated:

- Display luminance
- Gamma
- Flicker
- Moire artifacts, respectively other visual artifacts

A.2.9.24 Classic typewriters (11th meeting AG1 EK1):

DIN 2137 have to be applied for electronic typewriters.

A.2.9.25 Server (12th meeting AG1 EK1):
The test of server according annex 1 “Ergonomic basis for GS test of IT equipment in combination with visual display units EK1-ITB 2000)“ is effected to the following criteria:

Set-up Location of the server	**Decision criteria**	**GS-Ergonomics- test**
within a server room	without graphic board	Sound power level
	with graphic board	EK1-ITB 2000 (A.2.9.23) Sound power level Gloss
within a server room	with graphic board. The manufacturer declares that the set-up of the server is made in the server room only and shall not be in the field of vision of the user *)	EK1-ITB 2000 (A.2.9.23) Sound power level
outside a server room	to account as a PC (System unit)	EK1 ITB 2000

*) Scope: Declaration of the manufacturer given in the brochure and in the User’s Manual:

The product is not suitable for use at visual display workplaces according to §2 of the German Ordinance for Work with Visual Display Units.

Statements on the GS certificate:

- Test specification
- Hint that the tested product is not suitable for use at visual display workplaces.

A.2.9.26 Pocket PC’s having a size ≥ DIN A5 (approx. 25.5 cm, 10 inch) (12th meeting AG1 EK1):
For Pocket PC’s having a size up to DIN A4 the corresponding test principles have to be applied. Therefore “sub-notebooks” are included as well.

The minimum character size of 2.6 mm for key legends is applicable to characters only. Symbols like +, -, ; are excluded.

Pocket PC’s having a size < DIN A5 (approx. 25.5 cm, 10 inch) (28th meeting AG1 EK1)
The GS certification is not possible..

A.2.9.27 User’s Manual (12th meeting AG1 EK1):
Safety relevant instructions of the User’s Manual have to be delivered in paper format. It is not sufficient to store these instructions on a hard disk or a CD-ROM.

A.2.9.28 repealed (17th meeting AG1 EK1 decision **A.2.9.33**)

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A.2.9.29 Flat panel displays (13th meeting AG1 EK1):
The requirement of the inclination in front of the screen has not to be applied for flat panel displays.

A.2.9.30 Data to be supplied in GS certificates (14th meeting AG1 EK1):
For clear and uniform presentation of information a minimum data are required in GS certificates for IT products (see appendix 6).

A.2.9.31 Gloss of housing of peripheral devices (15th and 22 th meeting AG1 EK1):
The requirements for the gloss of housing apply to peripheral devices used at the visual display workplace according to BildscharbV. Peripheral devices intended for use outside the visual display workplace can receive a GS-Mark if the scope is indicated in the User's Manual as well as the certificate.That means the following wording is possible in situations where the use within the field of view is not intended and where sufficient hints are given in the User's Manual for the avoidance of such situations to ensure that display work is not affected.

Wording in the certificate: "This device is not intended for use in the direct field of view at visual display workplaces. To avoid incommoding reflexions at visual display workplaces this device must not be placed in the direct field of view."

Note:
(direct) field of view see ISO 8995, ISO 11064-4, EN 842, DIN 5340

A.2.9.32 Reflections with „Bright View Notebooks" (16th meeting AG1 EK1):
The GS certification for notebooks is possible, if EK1-ITB 2000 and ISO 9241-3xx are fulfilled. In addition pay attention to the following:

- Two test engineers have to evaluate the display surface by subjective and visual inspection. Aim of this test is to assess disturbing reflections in the intended context of use.

According to ISO 9241-307 the reflection classes have to be replaced by luminance and maximum illuminance values from ISO 9241-307:

- If disturbing reflections are detected in case of $L_{REF,EXT}$ = 200 cd/m² and/or $L_{REF,SML}$ = 2000 cd/m² the intended context of use has to be described in more detail within the safety instructions. A hint that the use in bright environments is restricted, e.g. during mobile use, must be given in the safety instructions as well as the GS certificate.

The statement depends on the intended context of use. Example:
"During mobile use with disadvantageous illumination conditions (e.g. direct sun light) reflections may occur which result in reduced readability".

A.2.9.33 Keyboard (17th meeting AG1 EK1)

A reduction of the key strokes for keyboards made of PBT material with laser inscription processes from 5 million to 2 million is possible if, after 2 million strokes a minimum contrast of 3,3:1 is achieved and the gloss level is under 20 gloss units.

A reduction of the key strokes for keyboards with laser inscription processes from 5 million to 4 million is possible if, after 4 million strokes a minimum contrast of 3,3:1 is achieved and the gloss level is under 20 gloss units.

The resolution A.2.9.28 is herewith nullified.

Note: The gloss level of key caps can be determined alternatively with gloss level plates (maximum matt or semi matt).
Hint: gloss templates/gloss level plates are available from Institut für Lackprüfung, Felsweg 19, 35435, Wettenberg, Germany.

A.2.9.34 Application of DIN EN 50332-1/-2 (18th, 19th and 28th meeting AG1 EK1)

The requirements of EN 50332 for limitations of the sound pressure level of ear-/headphone outputs is expanded to include stationary products with ear-/headphone outputs because they are subject to the same dangers regarding hearing damage/hearing loss. The following items have to be considered:

1. Measurement procedure
Test a) hast to be performend generally. For supplied ear-/headphones additionally test b is performend.

a) Electric test
In deviation to EN 50332 a measurement of the output voltage with adjustment of the volume control to center position has to be made with and without equalizer. During the measurements the equalizer is adjusted to its neutral or center position (factory setting). In case the reading is $\leq$ 150 mV the instructions for use must consider a warning note to fulfill the requirements according to EK1-ITB 2000. In case the reading is > 150 mV the requirements according to EK1-ITB 2000 are not fulfilled.

b) Acoustic test
In case of a system (IT device with an ear-/headphone) the type of the ear-/headphone (manufacturer and model/type) has to be specified in the instructions for use. The requirements according to EN 50332-1 have to be fulfilled. In deviation to EN 50332-1 the measurements shall be conducted with adjustment of the volume control to center position with and without equalizer. The instructions for use must contain a warning note.

Informative: A measurement of the output voltage with adjustment of the volume control and equalizer to maximum has to be carried out.

2. Warning note (example)

Excessive sound pressure from ear-/headphones can cause hearing damage /hearing loss.

Adjustment of the volume control as well as the equalizer to other settings than

the center position may increase the ear-/headphones output voltage and therefore the sound pressure level.

The use of factors influencing the ear-/headphones output other than those specified by the manufacturer (e.g. operating system, equalizer software, firmware, driver) may increase the ear-/headphones output voltage and therefore the sound pressure level.

The use of ear-/headphones other than those specified by the manufacturer may lead to heightened sound pressure level.

3. Exemption with portable devices (Addendum 28th meeting AG1 EK1)
For portable music player the existing requirements (A12 for EN60950-1 and EN 60065) have to be considered

A.2.9.35 Electronics scales with LCD indicators (18th meeting AG1 EK1)

The requirements for electronic scales with LCD indicators for the use in weighing work stations are to adhere to Annex 7.

Note: Products limited to one indicator line only are exempted.

A.2.9.36 No longer considered.

A.2.9.37 Critical temperatures of hot surfaces likely to be touched (22nd meeting AG1 Ek1)

The following products with critical surface temperatures were identified and must be considered separately during testing:

- Bottom side of a laptop
- Head-/Earphone
- Handheld Scanner

If the surface temperatures of CENELEC Guide 29 are exceeded a warning and safety note must be given in the instructions for use to address proper use and to exclude contact with surfaces of high surface temperatures.

Keyboards are not considered in CENELEC Guide 29.

A.2.9.38 Mounts and stands for monitors (33rd meeting AG1 EK1)

In addition to the requirements of the harmonized standards mounts and stands must be evaluated regarding to tilt and gloss (if in the field of vision).

A.2.9.39 Monitors without stand (33rd meeting AG1 EK1)

Generally monitors without stand are able to get GS mark.
The intended use of the device specified by the manufacturer must be taken into account in the evaluation. Requirements for mounts and stands (see A.2.9.38) must be specified in the product documentation.

A.3 Contents of the Test documentation

- product description
- intended context of use
- Test report according to DIN EN ISO/IEC 17025
- Specifications for sound emission values according to Annex 1

Annex 1: Tabular compilation of the ergonomic bases for the GS testing of IT devices in combination with visual display units.

Annex 2: Test procedure for character height

Annex 3: Cancelled - 12th meeting AG1 EK1

Annex 4: Requirements for flat panels for the GS-mark (Interpretation of ISO 9241-3xx)

Annex 5: Requirements for Pocket PC's

Annex 6: Specifications in a GS Certificate

Annex 7: Requirements for other devices

Annex 1: Basis for GS Test of IT Equipment in Combination with Visual Display Units (EK1-ITB 2000)

Requirement	Standard / Reference	Visual Display	PC (System unit)	Keyboard	Non-keyboard input devices	Notebook Pocket PC	Other devices (e.g. printer scanner, server, scales)
1 Image quality	DIN EN ISO 9241-3xx	**X**	**X**			**X**	**x** 10)
2 Input requirements	DIN EN ISO 9241-410 [13)]			**X**	**X**	**X** 3) 8)	**x** 4) 10)
	DIN 2137			**X** 2)		**X** 2) 8)	
3 Sound power level L_{WAd} (Operation according to manufacturer)	ISO 7779 (ISO 9296) BildscharbV, A 17.	**X** 1)	**X** 1)	**X** 1)	**X** 1)	**X** 1)	**X** 1) 11)
4 Tilt angle max. forward: Tilt angle min. backward:	BildscharbV, A 5.	5° 6) ≥ 5°		**X** 7)		 ≥ 5° 9)	
5 Swivel (rotation)	BildscharbV, A 5.	max. ± 180°					
6 Max. force to swivel	BildscharbV, A 5.	max. 100 N					
7 Brightness adjustable	BildscharbV, A 3.	**X**				**X**	**X** 10)
8 Contrast adjustable	BildscharbV, A 3.	**X** 4)				**X** 4)	**X** 4)
9 Gloss of housing	BildscharbV, A 8., A 15. DIN EN ISO 9241-3xx	≤ 20 gloss units	≤ 20 gloss units	≤ 20 gloss units	≤ 20 gloss units	≤ 20 gloss units	≤ 20 gloss units 12)
10 Headphone output	EN 50332	**X** 5)	**X** 5)	**X** 5)		**X** 5)	**X** 5)
11 Technical documentation	ProdSG	**X**	**X**	**X**	**X**	**X**	**X**
12 User's manual	ProdSG	**X**	**X**	**X**	**X**	**X** 8)	**X**

Remark:
Requirements marked with **X** have to be proved.

1) With noise emitting parts.
A plausibility check of the manufacturer data is necessary:
The test and the test report of the manufacturer containing the noise emission values have to be in accordance to the formal requirements of ISO 17025.
2) With German layout.
3) Apply DIN EN ISO 9241-410 excluding exceptions given in DIN 2137-2.
4) If technically provided.
5) if available (see A2.9.34)
6) only for CRT-VDU's
7) A mechanism for tilt shall be available, the maximum tilt is 15°.
8) Pocket PC: see Annex 5
9) Pocket PC: not applicable
10) see Annex 7
11) for server see A.2.9.25
12) for server see A.2.9.25, for peripheral devices see A.2.9.31
13) excluded noise emission

BildscharbV = German Ordinance for work with Visual Display Units, based on European Council Directive 90/270/EEC, ProsSG = German Product Safety law

Annex 2: Test procedure for character height: Example for 17“ CRT - VDU

Viewing distance: 500 mm
Resolution: 1024 x 768

System-configuration	Font	Character height		Matrix	Alternative test pattern for character „m“	Alternative test pattern for character „e“
Small fonts	Arial 10	2,95 mm	20,3‘	7 x 10	¦###¦###¦ ¦###¦###¦ ¦###¦###¦ ¦###¦###¦	¦¦¦¦ ¦¦¦¦ #### #### ¦¦¦¦ ¦¦¦¦ #### #### ¦¦¦¦
Large fonts	Arial 10	3,7 mm	25,4‘	9 x 12	¦####¦####¦ ¦####¦####¦ ¦####¦####¦ ¦####¦####¦	¦¦¦¦ ¦¦¦¦ #### #### #### ¦¦¦¦ ¦¦¦¦ #### #### ¦¦¦¦

Annex 3: Requirements for notebook keyboards

Cancelled - 12th meeting AG1 EK1

Annex 4: Ergonomic Requirements for flat panels for GS-mark

Determination of the intended context of use according to ***ISO 9241-307, (example)***

Element	Attribut	Quantification
User	Vision	User with normal or to normal corrected vision of any age, 7 years or older (any literate user).
Environment	Design screen illuminance, E_S	Vertical 250 lx + 250 lx × cos(α) in offices, where α is the screen tilt angle. The screen tilt angle is considered to be 75°.
	Typical components of the illumination: Large aperture source (15°) and small aperture source (1°) illumination	1. $L_{REF,EXT}$ = 200 cd/m² and $L_{REF,SML}$ = 2 000 cd/m² (suitable for general office use); 2. $L_{REF,EXT}$ = 200 cd/m² or $L_{REF,SML}$ = 2 000 cd/m² (suitable for most, but not all, office environments); 3. $L_{REF,EXT}$ = 125 cd/m² or $L_{REF,SML}$ = 200 cd/m² (requires a specially controlled luminous environment). Dabei ist: $L_{REF,EXT}$ is the luminance of the large aperture source (15°) and $L_{REF,SML}$ is the luminance of the small aperture source (1°).
	Illuminant	CIE illuminant D65
	Ambient temperature	ambient temperature of approximate 15°C to 35°C is considered.
Task	Content and perception	Artificial information
	Amount of information	Preferred screen size for sufficient amount of information with appropriate object size and resolution.
	Image type	Still image, quasi-static or moving image is considered, if not otherwise specified by the supplier.
	Design viewing distance, $D_{design,view}$	500 mm
	Design viewing direction, Θ_D, Φ_D	Within a specific range of angles from the normal.
	Design viewing direction range (angle of inclination and azimuth)	Viewing cone with a single visual display The maximum inclination angle range Θ_{range} is: Θ_{range} = 2 × arctan(D_{active}/2 × $D_{design,view}$). Where D_{active} is the diagonal of the active display area and $D_{design,view}$ is the design viewing distance. The design inclination angle is within 0° ≤ Θ_D ≤ 40° – Θ_{range}/2. The azimuth angle Φ is 0° bis 360°. NOTE This definition correspond to viewing direction range class $Class_{viewing}$ III of earlier ISO 13406-2.
	Eye and head position	From fixed to moving.
	Number of users	Typical single or multiple.
Usage	Display handling	For this compliance route stationary display handling is considered, if not otherwise specified by the supplier.

Annex 5: Ergonomic Requirements for Pocket-PC's (AG1 of EK1, 70-02)

1. Definition: Pocket-PC
PC with integrated Display, which is smaller than DIN A4 (12th meeting AG1 EK1) and bigger than DIN A5 (approx. 25.5 cm, 10 inch, 25th meeting AG1 EK1) and which includes an alphanumeric keyboard and/or a pen for data input and which is not used for steady work of visual display tasks.

2. Use of Pocket-PC
In general Pocket-PC's are hold by hand or standy-situated on a table.

3. Keyboard of Pocket-PC's (ISO 9241-410, ISO/IEC 9995):

ISO 9241-410	
Clause	Applicability/Limitation
B.2.3.1 m) Palm-rests	N/A
B.2.2.2.1 Sections of the keyboard	N/A
B.2.3.1 b) Home row height	N/A
B.2.3.1 d) Slope of the keyboard	applicable
B.2.3.1 e) Profile of keyboard	applicable
B.2.3.1 f) Keyboard surfaces and material properties of keyboards	applicable
B.2.1.3 Keyboard placement	N/A
B.2.3.1 l) Keyboard slope adjustment mechanism	N/A
B.2.3.1 a) Key layout and centre-line spacing	N/A
B.2.2.1.1 b) Keytop design	minimum 64 mm²
B.2.2.1.1 c) Displacement	applicable
B.2.2.1.1 e) Force/ displacement characteristics	applicable
B.2.2.1.1 f) Feedback	applicable
B.2.2.1.1 f) Kinaesthetic feedback	N/A
B.2.2.1.1 f) Auditory feedback	N/A
B.2.2.1.1 f) Visual feedback	applicable
B.2.2.1.1 g) Rebound action (bounce)	applicable
B.2.2.1.1 i) Key roll-over	applicable
B.2.2.1.1 h) Key repeat function	applicable (Software)
B.2.2.1.1 k) Graphical symbols	N/A
B.2.2.1.1 j) Geometric design of key legends	applicable
B.2.2.1.1 l) Number and positioning of legends	N/A
B.2.2.1.1 m) Durability of legends	applicable
B.2.3.1 h) Cursor keys and keys in the editing section	applicable
B.2.3.1 g) Numeric keypad	applicable if present
B.2.2.1.1 a) Keytop shape	applicable

ISO/IEC 9995-1		
Clause		Applicability/Limitation
7.4	Key location numbering requirements	applicable
8.1	Group positions	applicable
8.2	Level positions within one group	applicable

ISO/IEC 9995-2		
Clause		Applicability/Limitation
7	Arrangement and location of keys in the alphanumeric zone of the alphanumeric section	applicable
8	Functions of the alphanumeric zone of the alphanumeric section	applicable

ISO/IEC 9995-3		
Clause		Applicability/Limitation
5	Common secondary group layout	applicable
6	Complementary Latin group layout	applicable

ISO/IEC 9995-4	
Clause	Applicability/Limitation
5-10	applicable, if present

ISO/IEC 9995-5	
Clause	Applicability/Limitation
5-12	only grouping of Cursor keys only as „Cross“ or „Inverte T“ Layout applicable

ISO/IEC 9995-7	
Clause	Applicability/Limitation
5 Descriptions of functions	Not to apply as used keys are not commonly used

ISO/IEC 9995-8	
Clause	Applicability/Limitation
5-6	applicable, if present

Pen (DIN EN ISO 9241-410):
Requirements according ISO 9241-410 Clause I.2.3.3 (**Grasp surface)**, I.2.3.1 (**Size)** und I.2.3.2 (**Weight)** shall be fulfilled.

Remark in the Users Manual and certificate
„...nicht für permanente Bildschirmarbeit, nur für kurzzeitige Benutzung geeignet“
„...not for permanent video display work, suitable only for short time use”

Annex 6: Data to be provided by the GS certificate (minimum)

a) Notebook

Identifier	***Example***
1 Zertifikat-Nr. Certificate No.	*123456789*
2 Ausstellungsdatum Date of Issue	
3 Genehmigungsinhaber License Holder	*Notebook GmbH*
4 Fertigungsstätte Manufacturing Plant	*Notebook Manufacturing GmbH*
5 Abbildung des Prüfzeichens Figure of test mark	*= GS-Zeichen der Prüfstelle*
6 Prüfberichtsnummer Test Report No.	*987654321*
7 Prüfgrundlagen Test basis	*EN 60950-1* *EK1-ITB 2000*
8 Zertifiziertes Produkt (Geräteidentifikation) Certified Product (Product identification)	*Bezeichnung* *Type designation*
9 Nennspannung/-frequenz Rated Voltage / Rated Frequency	*Xvc V/u Hz*
10 Nennstrom Rated Current	*S A*
11 Schutzklasse Protection Class	*N*
12 LCD-Display/Modul LCD Panel	*Xyxxxx123*
13 Pixelfehlerklasse Pixel Fault Class	*P*
14 Geeignet für maximale Beleuchtungsstärke nach EN 12464-1 Leuchtdichte von gerichtet reflektierten Lichtquellen (großflächige Lichtquelle (15°), kleinflächige Lichtquelle (1°)) Suitable for maximum illuminance according to EN 12464-1 Componente of illumation (large aperture soucre (15°), small aperture source (1°))	lx cd/m², cd/m²
15 vorgesehener Sehabstand design viewing distance	*ef*
16 vorgesehene Sehrichtung und Sehrichtungsbereich design viewing direction and viewing direction range	°
Inhalt und Wahrnehmung Content and perception	
18 deklarierter Schallleistungspegel Declared Sound Power Level	*Kl dB(A)*
19 Gültigkeitsdauer des Zertifikates Certificate valid until	*tt.mm.yyyy*
20 Name des Zertifizierers Name of the person who does the certification	*V. Certus*
21 Unterschrift des Zertifizierers Signature of the person who does the certification	
22 Zertifizierungsstelle mit Angabe der Anschrift Certification Body inc. address	*Cert GmbH, Certhausen*
23 Hinweis, dass dem Zertifikat eine Prüf- und Zertifizierungsordnung zugrunde liegt. Hint, that the certificate is based on Testing and Certification Regulations.	
24 Feststellung, dass das Produkt die Anforderungen des ProdSG erfüllt. Statement, that the product meets the requirements of ProdSG.	

b) Flat Panel Display

Identifier	***Example***
1 Zertifikat-Nr. Certificate No.	*123456789*
2 Ausstellungsdatum Date of Issue	
3 Genehmigungsinhaber License Holder	*Display GmbH*
4 Fertigungsstätte Manufacturing Plant	*Display Manufacturing GmbH*
5 Abbildung des Prüfzeichens Figure of test mark	*= GS-Zeichen der Prüfstelle*
6 Prüfberichtsnummer Test Report No.	*987654321*
7 Prüfgrundlagen Test basis	*EN 60950-1* *EK1-ITB 2000*
8 Zertifiziertes Produkt (Geräteidentifikation) Certified Product (Product identification)	*Bezeichnung* *Type designation*
9 Nennspannung/-frequenz Rated Voltage / Rated Frequency	*Xvc V/u Hz*
10 Nennstrom Rated Current	*S A*
11 Schutzklasse Protection Class	*N*
12 LCD-Display/Modul LCD Panel	*Xyxxxx123*
13 Pixelfehlerklasse Pixel Fault Class	*P*
14 Geeignet für maximale Beleuchtungsstärke nach EN 12464-1 Leuchtdichte von gerichtet reflektierten Lichtquellen (großflächige Lichtquelle 15°, kleinflächige Lichtquelle 1°) Suitable for maximum illuminance according to EN 12464-1 Componente of illumation (large aperture soucre (15°), small aperture source (1°))	lx cd/m², cd/m²
15 vorgesehener Sehabstand Design viewing distance	*ef*
16 vorgesehene Sehrichtung und Sehrichtungsbereich Design viewing direction and viewing direction range	°
Inhalt und Wahrnehmung Content and perception	
19 Gültigkeitsdauer des Zertifikates Certificate valid until	*tt.mm.yyyy*
20 Name des Zertifizierers Name of the person who does the certification	*V. Certus*
21 Unterschrift des Zertifizierers Signature of the person who does the certification	
22 Zertifizierungsstelle mit Angabe der Anschrift Certification Body inc. Address	*Cert GmbH, Certhausen*
23 Hinweis, dass dem Zertifikat eine Prüf- und Zertifizierungsordnung zugrunde liegt. Hint, that the certificate is based on Testing and Certification Regulations.	
24 Feststellung, dass das Produkt die Anforderungen des ProdSG erfüllt. Statement, that the product meets the requirements of ProdSG.	

c) PC (Personal Computer)

Identifier	***Example***
1 Zertifikat-Nr. Certificate No.	*123456789*
2 Ausstellungsdatum Date of Issue	*tt.mm.yyyy*
3 Genehmigungsinhaber License Holder	*PC GmbH*
4 Fertigungsstätte Manufacturing Plant	*PC Manufacturing GmbH*
5 Abbildung des Prüfzeichens Figure of test mark	*= GS-Zeichen der Prüfstelle*
6 Prüfberichtsnummer Test Report No.	*987654321*
7 Prüfgrundlagen Test basis	*EN 60950-1* *EK1-ITB 2000*
8 Zertifiziertes Produkt (Geräteidentifikation) Certified Product (Product identification)	*Bezeichnung* *Type designation*
9 Nennspannung/-frequenz Rated Voltage / Rated Frequency	*Xvc V/u Hz*
10 Nennstrom Rated Current	*S A*
11 Schutzklasse Protection Class	*N*
18 deklarierter Schallleistungspegel Declared Sound Power Level	*Kl dB(A)*
19 Gültigkeitsdauer des Zertifikates Certificate valid until	*tt.mm.yyyy*
20 Name des Zertifizierers Name of the person who does the certification	*V. Certus*
21 Unterschrift des Zertifizierers Signature of the person who does the certification	
22 Zertifizierungsstelle mit Angabe der Anschrift Certification Body inc. address	*Cert GmbH, Certhausen*
23 Hinweis, dass dem Zertifikat eine Prüf- und Zertifizierungsordnung zugrunde liegt. Hint, that the certificate is based on Testing and Certification Regulations.	
24 Feststellung, dass das Produkt die Anforderungen des ProdSG erfüllt. Statement, that the product meets the requirements of ProdSG.	

Annex 7: Requirements for other devices

7.1 Remarks on electronic scales

Electronic scales with indicators for the weighing of wares for use at cash registers and weihing work stations (i.e. as weighing or measuring instruments by employees of markets).
The use/implementation usually takes place at stationary cash register and weighing work stations as well as at standing and sitting work stations

7.2 Requirements

Other devices with LCD indicators and display terminals must comply with the same requirements as those for flat panel displays. The actual context of use (environment, task, user) are to be taken into consideration. For technologies other than LCD, the analog equivalent standardized requirements apply.

Requirement	**Standard / Referenz**	**Other devices (e.g. printer scanner, server, scales)**
1 Image quality	DIN EN ISO 9241-3xx	**X** 1)
2 Input requirements	DIN EN ISO 9241-410	**X** 7) 8)
	DIN 2137	**–**
3 Sound power level L_{WAd} (Operation according to manufacturer)	ISO 7779 (ISO 9296) BildscharbV, A 17.	**X** 3)
4 Tilt angle max. forward: Tilt angle min. backward:	BildscharbV, A 5.	≥ 5° 4)
5 Swivel (rotation)	BildscharbV, A 5.	**–**
6 Max. force to swivel	BildscharbV, A 5.	**–**
7 Brightness adjustable	BildscharbV, A 3.	**X** 5)
8 Contrast adjustable	BildscharbV, A 3.	**X** 2)
9 Gloss of housing (Reflexion)	BildscharbV, A 8., A 15. DIN EN ISO 9241-3xx	≤ 20 gloss units 6)
10 Headphone output	EN 50332	**X** 2)
11 Technical documentation	ProdSG	**X**
12 Instructions for use	ProdSG	**X**

Remarks:
Requirements marked with an X must always be included

1) Analysis of the character attributes of the used character sets as well as the contrast of the given colour combinations and reflection.

	DIN EN ISO 9241-303	DIN EN ISO 9241-307	DIN EN ISO 9241-305
Analysis of the character attributes of the various character sets	5.5.4 Character height 5.5.5 Text size constancy 5.5.6 Character stroke width 5.5.7 Character width-to-height ratio 5.5.9 Between-character spacing 5.5.10 Between-word spacing 5.5.11 Between-line spacing	Table 75 Viewing distance: - for handheld devices: minimum 300 mm - others: minimum 500 mm	P20.5 P20.7 P20.8 P20.12 P20.13 P20.14
Contrast of the colour combinations	5.5.2 Luminance contrast	Table 70 (measurement contrast under diffuse illumination 500 lx, contrast min. 3:1)	P18.2
Reflection	5.4.11 Unwanted reflections	Visual evaluation of the unwanted reflections: The reflection should be as small as possible. It schould be possible to minimize unwanted reflections (e.g.by changing the position (angle) of the display).	

Single line displays will be excluded from the evaluation

2) if technically provided

3) With noise emitting parts
A plausibility check of the manufacturer data is necessary:
The test and the test report of the manufacturer containing the noise emission values have to be in accordance to the formal requirements of ISO 17025.

for server see A.2.9.25

4) This requirement is only valid for electronic scales

5) This requirement is only valid for ≥ DIN A5 (approx. 25.5 cm, 10 inch)

6) for server see A.2.9.25, for peripheral devices see A.2.9.31

7) Relating to other physical input devices (except keyboards), if technically provided

8) The following requirements of ISO 9241-410 are applied:

Keyboards:

- B.2.2.1.1 a) Keytop shape
- B.2.2.1.1 b) Strike surface (64 mm² for all keys)
- B.2.2.1.1 d) Force
- B.2.2.1.1 g) Bounce
- B.2.2.1.1 h) Key repeat function
- B.2.2.1.1 j) Geometric design of key legends
- B.2.2.1.1 m) Durability of legends
- B.2.3.1 f) Keyboard surfaces and material properties
- B.2.3.1 g) Numeric keypad
- B.2.3.1 l) Adjustability

Berührungsbildschirme:

- J.2.3.1 Orientation
- J.3 Documentation